Subject development for the Remote Sensing education by ALOS data

Toshiro Sugimura(1), Keishi Iwashita(2), Hideki Hashiba(3)

(1)Remote Sensing Technology Center of Japan
1-9-9 Roppongi, Minato-ku, Tokyo 106-0032 Japan
sugimura@restec.or.jp
(2)Nihon University, College of Industrial Technology
1-2-1 Izumi-cho, Narashino-shi, Chiba 275-8575 Japan
iwashita@civil.cit.nihon-u.ac.jp
(3)Nihon University, College of Science and Technology
1-8-14 Kanda Surugadai, Chiyoda-ku, Tokyo 101-8308 Japan
hashiba3@civil.cst.nihon-u.ac.jp

Abstract
The education is important for spreading remote sensing technology. Therefore the subjects which can be used in an educational front and the basic exercises which can be applied easily in a class are necessary. In the scientific research working group "Remote Sensing DataRESTEC format and TIFF format Analysis by Personal Computer" of the Remote Sensing Society of Japan (RSSJ), we continue this activities to spread remote sensing technology since a held of "The training course of remote sensing data analysis using personal computer system" in 1987[1][2]. Taking advantages of ALOS, have been launched in 2006, we started to maintain and develop subjects for the education using ALOS data.

Keyword: education, basic program, PC

1. GENERAL

The working group is composed of the various research fields, such as urbane, environment, oceanography, forestry, data processing, etc. A member can prepare an educational subject from the beginning class to the advanced class in each research field[3][4]. Now, we are incorporating the examples which are processed using the ALOS data. They are,

(1) Urban environmental analysis
(2) Forestry condition analysis
(3) Glacier lake monitoring

2. SOFTWARE

A free software developed for the RSSJ training course "Remote-10[5]" was modified for the ALOS data processing. Some basic processing functions are necessary for the exercised. The functions of Remote-10 for this purpose are as follows,

(1) Data Input/Output
Input satellite data of the various format, i.e., CEOS format, RESTEC format, Landsat/TM fast format, TIFF format and any other binary files, and output by the format of RESTEC format and TIFF format.

(2) Displaying
Display images by several ways, i.e., color composite image, gray scale image and level sliced image.

(3) Measurement
Measure the histogram, digital number and coordinates of selected pixel and single-cell signature.

(4) Processing
Process classification, orientation, resampling, operation, filtering and HSI conversion.

(5) Others
The other functions, developed specially for ALOS data processing, are orientation by leader file, DEM generation and 3D transformation.

3. APPLICATION

e

Using the functions of Remote-10, several processing were tested for the preparation of next subjects.

(1) Landcover classification
After the selection of the training area from the ALOS/AVNIR-2 image shown in Fig.1, we obtained the classified image shown in Fig.2. To compare with the past case of Landsat/TM, the result was processed by the majority filter. The result was shown in Fig.3. This is similar with the one by Landsat/TM. ALOS data can apply time-sequential analysis with the Landsat data.

(2) Vegetation Index
The volcanic fumes from Miyakejima, located approximately 200 km southwest from the mainland of Japan, have affected the vegetation health and biomass of the Tokyo metropolitan area. The potential for measuring relative forest damage and recovery in the Bosoh Peninsula were evaluated using LANDSAT/TM data and ASTER data[4]. Using ALOS/AVNIR-2, recent

condition was monitored by ratio function.

(3) DEM generation
Stereo pair images of JERS-1/OPS, TERRA/ASTER, SPOT/HRV, etc. give us the Earth's surface feature information. Using ALOS/PRISM data, we tested to measure the parallax of distortion in the pair images. Processing 4 × 4 averaging function, we obtained a good result for the exercise.

(4) 3-D displaying
3-D viewing image can be generated by the combination of the satellite image and DEM data. This image give us an easy observation of the geographical feature and interpretation of land cover. In the case of ALOS, both information can be observed by an ideal combination and in a same time.

4. CONCLUSION

ALOS data contribute many subjects, prepared for the "Remote Sensing Training Course", to advance their quality. Maintaining subjects, we are going to hold a remote sensing training course in the next summer.
The latest version of software "Remote-10" can be used from the next URL.
http://www.restec.or.jp/ersearch/remo10w.exe

5. REFERENCES

[1] The scientific research working group "Remote Sensing Data Analysis by Personal Computer" , "Report of the Training Course of Remote sensing Data Analysis Using Personal computer System" , Journal of the Remote Sensing society of Japan, Vol.7, No.3, Sep.1987, pp.69−105

[2] The Executive Committee of Summer School "Report of the 2nd Training Course of Remote Sensing Data Analysis Using Personal Computer System" , Journal of the Remote Sensing Society of Japan, Vol8, No.4, Dec.1988, pp.59-65

[3] Keishi Iwasita, et.al., "Vegetation Biomass Change of the Bohsoh Peninsula", Advances in Space Research, 37, 2006, pp.734-740

[4] H.Hashibam et.al., "Evaluation of city environment with vegetation covers by using several kinds of high- resolution satellite images", ASPRS, 2006 Annual Conference Proceedings, May 2006, CD-ROM 104427, pp1-9

[5] S.Tanaka, T.sugimura, "A Multi-spectral Data Analysis System 'Remote-10' by a Personal Computer" , Journal of the Remote sensing Society of Japan, Vol.8, No.4, Dec.1988, pp.67-71

Figure 1. Color composite image

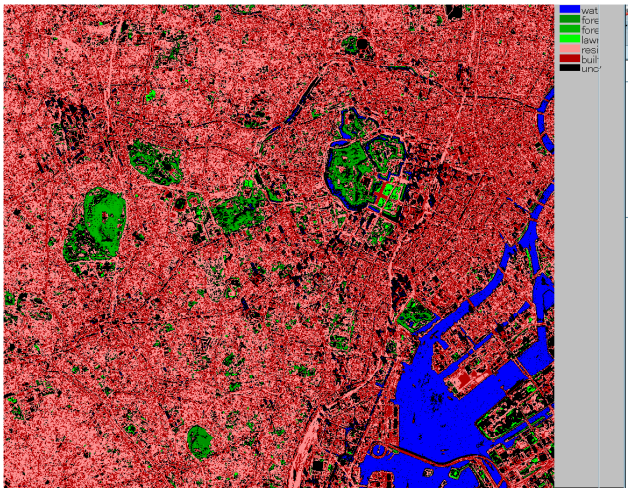

Figure 2. Classified image

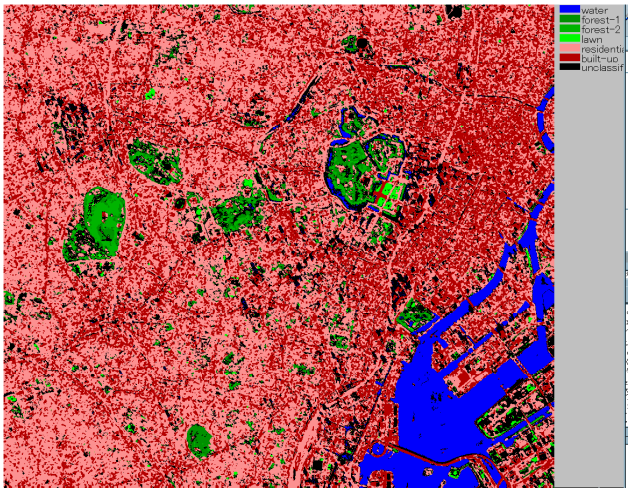

Figure 3. A sample of filterring(majority filter)